

REMARKS

Paper 8, first filed by applicant on July 30, 2003 and re-filed on February 4, 2004, amended the specification to include new claims 11 - 20. These claims were not referenced in the subsequent final Office Action dated June 18, 2004 and do not appear to have been examined. A phone call to the examiner from applicant's attorney regarding this discrepancy has not been returned. Applicant requests the finality of the Office Action dated June 18, 2004 be withdrawn pending examination of claims 11 - 20. Upon examination and in view of the arguments below regarding claim 1, applicant believes the examiner will find independent claim 11 to be patentable. It follows that dependent claims 12 - 20 are also patentable.

Claims 1-10 stand rejected under 35 U.S.C 102(e) as being anticipated by Chen et al.

The present invention, as defined by claim 1, includes the limitation: "determining a number of available bits for each group of pictures from each program stream" (claim 1, lines 5 - 6). In the first office action, mailed April 1, 2003, the examiner asserted that the above limitation was anticipated by Chen (Col. 5, lines 53-65). In response, applicant pointed out that the cited portion of Chen only shows that the MTS bitstream is partitioned into processing units (paper 8: page 11, lines 1 - 7) and submitted that such partitioning does not anticipate the above limitation of claim 1. The examiner, in the subsequent office action, mailed June 18, 2004, disagreed with the applicant's overall argument as set forth in paper 8, but did not specifically address this point. Rather, the examiner responded (office action mailed June 18, 2004: point 3, paragraph 2, lines 4 - 16) to the preceding paragraph of applicant's response (paper 8: page 10, lines 32 - 33) and incorporated the paragraph cited above (paper 8: page 11, lines 1 - 7) without addressing the arguments of that paragraph.

Furthermore, the examiner's assertion that the aforementioned preceding paragraph of applicant's response (paper 8: page 10, lines 32 - 33) relates to a claimed limitation of the present invention (office action mailed June 18, 2004: point 3, paragraph 2, lines 4 and 16) is inaccurate. The phrase cited by the examiner, "transrating a program stream on a GOP basis depending on the number of bits in the GOP" (paper 8: page 10, lines 32 - 33), does not appear in independent

claim 1 or dependent claims 2 - 9 and was used in applicant's response as a general observation of what applicant believed was not disclosed by Chen (paper 8: page 10, line 31).

Regarding subject matter that is defined by claim 1, the portion of Chen (Col. 5, lines 53 - 65) cited by the examiner in the office action of April 1, 2003 only shows the division of an MTS bitstream into "processing units". Whether or not these "processing units" anticipate a GOP is immaterial, as lines 5 - 6 of claim 1 do not relate to such a division. The "available bits" for a given group of pictures (GOP) referred to in claim 1 is defined in the specification as being the bits available to allocate for the transmission of the GOP (specification: page 10, line 19 - page 11, line 10). Applicant has amended the specification to use the phrase "available bits" where applicable for purposes of clarity, however applicant believes that the original wording of the specification would also accurately convey the intended meaning of the phrase "available bits" to one skilled in the art. Applicant also believes that the use of the preposition "for", as in "a number of available bits for each group of pictures" (emphasis added), clearly conveys that the "number of available bits" is not a characteristic of a GOP, but rather indicates that the GOP is the object of an action, i.e. "determining a number of available bits". Applicant believes it is clear from interpreting claim 1 in light of the specification that lines 5 - 6 of claim 1 relate to determining how much room, i.e. the number of available bits, that can be used in the constant bit rate (CBR) packetized transport stream to transmit a particular GOP. Applicant respectfully refers the examiner to the example beginning on line 19 of page 7 of the specification. In the example, the CBR packetized transport stream is constrained to a bit rate of 5 Mbps and three program streams (prog1, prog2, and prog3) are being used to construct the CBR packetized transport stream ($N = 3$). If the GOPs of prog1 and prog2 have a number of bits corresponding to 1.5 Mbps each, then it follows that the GOPs of the third program stream (prog3) must be limited to having a number of bits corresponding to no more than 2 Mbps:

available CBR - prog1 bit rate - prog2 bit rate = available prog3 bit rate

$$5 \text{ Mbps} - 1.5 \text{ Mbps} - 1.5 \text{ Mbps} = 2 \text{ Mbps}.$$

Lines 5 - 6 of claim 1 relate to making this determination of the number of available bits for Prog3, or any of the N program streams, being included in the CBR packetized transport stream. Applicant submits that making such a determination is in no way equivalent to parsing an input stream into 'processing units' as described by Chen.

The present invention, as defined by claim 1, also includes the limitation "inserting each group of pictures into the constant bit rate packetized transport stream when the number of bits for said group of pictures is less than or equal to the number of available bits for said group of pictures" (claim 1, lines 7 - 10). In the above example, this would correspond to prog3 having a bit rate of less than or equal to 2 Mbps.

In the first office action, mailed April 1, 2003, the examiner asserted that the above limitation was anticipated by Chen (Col. 1, lines 20 - 25, Col. 7, lines 15 - 20 and Col. 9, lines 55 - 63). In response, applicant pointed out that the first cited portion of Chen (Col 1, lines 20 - 25) shows that the source of Chen's video sequences could be a constant bit rate packetized stream (paper 8: page 11, lines 11 - 16), the second cited portion of Chen (Col. 7, lines 15 - 20) is concerned with average processing delay time in a queue (paper 8: page 11, lines 22 - 23), and the third cited portion of Chen (Col. 9, lines 55 - 63) is concerned with different approaches to the processing of pictures depending on whether they are in the same or different groupings (paper 8: page 11, lines 23 - 25). Applicant also submitted that combining the cited portions of Chen does not anticipate the above limitation of claim 1.

The examiner, in the subsequent office action, mailed June 18, 2004, stated that applicant "argued that Chen fails to disclose '...inserting each group of pictures ... into the constant bit rate packetized transport stream...' as in the claims" (office action mailed June 18, 2004: point 3, paragraph 3, lines 1 - 3). Applicant believes that the examiner is referring to lines 7 - 10 of claim 1 and that the placement of an ellipsis between the words "pictures" and "into" was unintentional. The examiner goes on to make several assertions regarding the characteristics of the CBR packetized transport stream and how the CBR packetized transport stream relates to the method of claim 1. However, applicant respectfully disagrees with several points of the examiner's arguments.

For instance, the examiner notes that the constant bit rate (CBR) nature of the stream as recited only corresponds to the input characteristics of the stream and that as long as the insertion process occurs with the newly transrated GOP being interleaved into the originally input CBR stream, it would read on the claim (office action mailed June 18, 2004: point 3, paragraph 3, lines 3 - 6). Applicant assumes the examiner intended to argue that as long as the insertion process occurs with the newly transrated GOP being interleaved into the originally input CBR stream, it would read on the reference, i.e. Chen. Assuming the examiner is referring to the CBR packetized transport stream of claim 1, applicant observes that nowhere in claim 1 is it stated that the CBR packetized transport stream is an "input" of the method defined by claim 1. Rather the CBR packetized transport stream is, in part, created by the method defined by claim 1. As described in the specification, a plurality of video programs, each broken into multiple GOPs, are provided via a wide-band transmission stream to a demultiplexer where they are divided into single program transmission streams (SPTSs). A sub-set of the SPTSs is then recombined into a CBR packetized transport stream to be transmitted to a subscriber's location. In the recombination process it may or may not be necessary to reduce the size of any or all of the GOPs that make up the SPTSs in order to accommodate the bandwidth limitations of the transmission medium. The invention defined by claim 1 relates to determining whether any reduction in size of a GOP is necessary and, if so, performing the necessary transrating. The CBR packetized transport stream defined in claim 1 cannot be an input to the method of claim 1 because, when the method operates on a particular GOP, the data that will eventually correspond to that GOP in the CBR packetized transport stream being transmitted to the subscriber will not be created until the method finishes operating on the GOP in question and inserts the data into the CBR packetized transport stream.

The examiner also refers to "the newly transrated GOP" (office action mailed June 18, 2004: point 3, paragraph 3, line 5), but in the relevant portion of claim 1 (lines 7 - 10) no transrating has taken place. As described in the specification, if the size, in bits, of the GOP as received is less than the GOP's "number of available bits" then

the GOP is merely inserted into the CBR packetized transport stream in the same condition it was received in.

The examiner goes on to assert that "the CBR/VBR nature of the packetized transport stream after insertion needs to be defined by the claims, for the argument presented to have sufficient weight" (office action mailed June 18, 2004: point 3, paragraph 3, lines 6 - 8) and because the "CBR/VBR nature of the packetized transport stream" is not specified in the claims applicant's argument, outlined above, is not valid. Applicant respectfully disagrees and observes that there is no such "CBR/VBR" nature of the CBR packetized transport stream referenced in the specification or in applicant's subsequent response (paper 8). A variable bit rate single program transport stream is referred to in the specification (page 3, line 14) but only as a possible source to be multiplexed into a CBR outgoing MTS (page 3, line 15). The preamble of claim 1 states "A method of bandwidth optimization for a constant bit rate packetized transport stream..." (claim 1, lines 1 - 2). Applicant submits that a person of ordinary skill in the art would not interpret claim 1 as attempting to optimize the bandwidth of a transport stream that is not to be subsequently transmitted, as there would be no "bandwidth" to optimize.

Applicant respectfully submits that because, as established above, Chen does not disclose "determining a number of available bits", Chen therefore can not possibly disclose "inserting each group of pictures into the constant bit rate packetized transport stream when the number of bits for said group of pictures is less than or equal to the number of available bits for said group of pictures" (emphasis added) as Chen does not disclose having the information required to make such a decision.

The present invention, as defined by claim 1, also includes the limitation "transrating each group of pictures when the number of bits in said group of pictures is greater than the number of available bits for said group of pictures so that the total number of bits in the groups of pictures is less than or equal to the total number of available bits;" (claim 1, lines 11 - 15). In the above example, this would correspond to the GOP of prog3 having a bit rate of greater than 2 Mbps. The GOP would accordingly be transrated in order to lower the number of bits in the GOP until the number of bits in the GOP corresponded to a bit rate less than or equal to 2 Mbps.

In the first office action, mailed April 1, 2003, the examiner asserted that the above limitation was anticipated by Chen (Col. 5, lines 48 - 53). In response, applicant pointed out that the cited portion of Chen is concerned with scheduling a queue of bitstream units in order that a transcoding process will be efficient and submitted that the cited portion of Chen does not anticipate the above limitation of claim 1. The examiner, in the subsequent office action, mailed June 18, 2004, disagreed with applicant's position, stating that the cited portion of Chen discloses "transcoding a queue of bitstream units for efficiency" (office action mailed June 18, 2004, point 3, paragraph 5, lines 3 - 4) and that therefore the cited transcoding occurs within the limits established by the availability of bits.

Applicant respectfully submits that because, as established above, Chen does not disclose "determining a number of available bits", Chen therefore can not possibly disclose "transrating each group of pictures when the number of bits in said group of pictures is greater than the number of available bits for said group of pictures " (emphasis added) as Chen does not disclose having the information required to make such a decision.

The present invention, as defined by claim 1, also includes the limitation "inserting each transrated group of pictures into the constant bit rate packetized transport stream" (claim 1, lines 16 - 17). Applicant observes that this limitation, as with the prior discussed limitation is dependent on the number of bits of the GOP being greater than the number of available bits. In the above example, after the transrating has taken place, the newly transrated GOP is inserted into the CBR packetized transport stream.

In the first office action, mailed April 1, 2003, the examiner asserted that the above limitation was anticipated by Chen (Col. 6, lines 19 - 23). In response, applicant pointed out that the cited portion of Chen is concerned with the data output from the processors being provided to stat mux 130 to form an output bitstream and submitted that the cited portion of Chen does not disclose that this output bit stream is a constant bit rate stream. The examiner, in the subsequent office action, mailed June 18, 2004, disagreed with applicant's position, stating that the cited portion of Chen discloses an inserting step. The examiner then repeated the argument described

in the preceding paragraphs regarding the CBR nature of the stream being an input characteristic of the stream. Applicant submits that the discussion in the preceding paragraphs relating to the constant bit rate packetized transport stream of claim 1 sufficiently shows that the examiner's position is incorrect.

Applicant submits that Chen does not disclose all elements of the invention defined by claim 1. Specifically, Chen does not disclose determining a number of available bits for a GOP, inserting the GOP into a CBR packetized transport stream if the number of available bits is greater than the number of bits in the GOP, or transrating the GOP if the number of available bits is less than or equal to the number of bits in the GOP and inserting the transrated GOP into the CBR packetized transport stream. This is best evidenced by Chen's lack of disclosure of a constant bit rate packetized transport stream and by Chen's lack of disclosure regarding determining a number of available bits as discussed above. The lack of this determination step inherently prevents Chen from disclosing the two subsequent steps of the method. Therefore applicant submits that claim 1 is patentable over Chen. It follows that dependent claims 2 - 9 are also patentable.

The CBR nature of the packetized transport stream, the relation of the CBR packetized transport stream to the method defined in claim 1, and the optimization issues related to the CBR packetized transport stream are the very crux of applicant's invention. Applicant believes that these features have not received the level of attention required in order to justify a rejection under 35 U.S.C. 102(a).

Respectfully submitted,



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PAGE 1

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